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ABSTRACT

This paper describes the Teacher Support Specialist in Science (TS[cubed]) project, which was conducted at the University of Georgia. This project aimed to provide subject-specific instructional support to inexperienced and student teachers by way of mentoring. During this project, three sets of data were collected to reflect participants reactions to this program: (1) a questionnaire before the summer TS[cubed] course; (2) semi-structured interviews; and (3) evaluator observations during the course. University of Georgia scientists and science educators, secondary science teachers, and Regional Educational Service Agency (RESA) personnel were involved in the program planning and instruction. (YDS)

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# TEACHER SUPPORT SPECIALIST IN SCIENCE ($TS^3$): SOCIALIZING PROSPECTIVE SECONDARY TEACHERS INTO THE PROFESSION

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In 1990, the Georgia Department of Education initiated the Teacher Support Specialist (TSS) Program[1], an inservice program that prepares veteran teachers to provide the individual support and mentoring so desperately needed by student teachers and early career teachers. While extremely successful, the TSS Program falls short in providing the subject specific information and experiences that would help veteran teachers do a better job of supporting beginning teachers. To be most effective in working with their new colleagues, veteran science teachers need to know (a) about the needs and problems of today's beginning science teachers, (b) how to work with these beginning teachers as adult learners, (c) the supervisory models and strategies that can be applied to science learning situations, and (d) recent advances in the science disciplines studied by beginning teachers in their college and university classes. These needs of veteran science teachers were coupled with the requirements for TSS certification in the 1998 Teacher Support Specialist in Science ($TS^3$) project.

This paper describes the initial phases of the Eisenhower funded $TS^3$ project carried out at the University of Georgia in 1998 and reports the findings of preliminary evaluation efforts. Because the project is still being implemented, all project activities have yet to be evaluated and the overall benefits of the project are still being determined.[1]

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## Project Description

The purpose of the project was to prepare a cadre of secondary teachers capable of providing the subject specific instructional support and mentoring needed by science student teachers and early career science teachers. The plan called for this to be accomplished through sustained contact with a project staff that included Regional Education Service Agency personnel, university scientists and science educators, and veteran science teachers (grades 7-12) who are experienced mentors. Specifically, the project was designed to help secondary science teachers to: (a) become knowledgeable of [1]effective practices and principles in science teaching, classroom observation and conferencing, adult learning, professional ethics, and reflective teaching; (b) become knowledgeable of recent advances in the sciences; (c) reflect on and improve their efforts to support and mentor beginning science teachers; and (d) establish collaborative relationships with other Teacher Support Specialists in Science, Teacher Support Specialist trainers, and scientists and science educators from the University of Georgia.

The project began in March, 1998 and will run through May, 1999. To date, the Preparation and Instruction phases of the project have been completed. The Sustained Contact phase is ongoing and the Presentation phase will culminate in February, 1999. The schedule of project events is presented in Figure 1.

The *Preparation* phase involved assembling a project staff, selecting teacher participants, assembling instructional materials, and planning for course and sustained contact activities. Course planning involved evaluating instructional materials to augment the TSS program resources, locating new materials, and meeting with scientists to plan science content update sessions.

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During the *Instruction* phase, led by Koballa, Gustafson and Keys, the teacher teams participated in a 50-hour course for which they will receive 5 staff development unit

Figure 1. Project Schedule

| | |
|---|---|
| Preparation Phase | |
| March-June, 1998 | Planning and participant team selection<br>Assembling project staff, including veteran teachers |
| Instruction Phase | |
| June 22-July 3 | Class sessions from 8:30 a.m. to 1:00 p.m.<br>June 22 - Introduction to Science-Specific TSS<br>June 23 - Problems and Needs of Beginning Science Teachers<br>Action Plan Development (veteran teachers)<br>June 24 - Science Teachers as Adult Learners<br>Science Update Session (UGA scientist)<br>June 25 - Legal, Professional and Ethical Issues in Science Teaching<br>Action Plan Development (veteran teachers)<br>June 26 - Learning Styles and Science Teaching<br>June 29 - Elements of Effective Science Teaching<br>June 30 - Promoting Professional Growth By Reflective Teaching<br>Action Plan Development (veteran teachers)<br>July 1 - Models of Supervision<br>Science Update Session (UGA scientist)<br>July 2 - Supervisory Skills in Science Teaching and Learning<br>Action Plan Development (veteran teachers)<br>July 3 - Action Plan Presentations and Preparing for Sustained Contact (veteran teachers) |
| Sustained Contact Phase | |
| Sept '98-May '99 | Sustained contact sessions from 4:45 to 7:00 p.m.<br>Sept 15 - Issues and Concerns of Mentoring University Students<br>Sept 29 - Applying Models of Supervision<br>Oct 13 - Practicing and Enhancing Supervisory Skills<br>Oct 27 - Addressing Learning Styles<br>Nov 10 - Considering Effective Teaching in Science<br>Nov 24 - Program Assessment and Preparation for GSTA<br>(Each session's activities will be geared to help the teams to reflect on the understandings constructed during the summer and implement their |

| | |
|---|---|
| | action plans. Audio and video tapes of participants' mentoring sessions will be used to aid reflection. Student teachers will be encouraged to participate in these sessions. Topics of the sessions may change depending on the participants needs and concerns.) Project staff will visit each teacher team at their school at least twice to gauge the success of their implementation efforts. |
| Presentation Phase | |
| February, 1999 | Teachers will present their personal cases of working with student teachers at the GSTA meeting. |

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(SDU) credits. The summer course included sessions on the problems and needs of beginning science teachers, working with adult learners, supervisory models and skills, learning styles, reflective teaching, elements of effective science teaching, and legal and professional issues in science teaching. Science content sessions led by university scientists were also part of the summer course. The culminating experience of the course was the development of an action plan by each teacher for supporting and mentoring science practicum students during fall semester 1998.

During the *Sustained Contact* phase, the teachers participated in six afterschool sessions and worked intensively with University of Georgia students during the fall practicum experience as specified in their action plans. The afterschool sessions were intended to supplement the summer coursework and involve teachers in instructional activities regarding their mentoring of university students and early career teachers. The sessions provided them with opportunities to discuss concerns and resolve problems related to the implementation of their action plans. During this phase, the project evaluator and one other member of the project staff visited the school sites. The staff member, who also taught one of the two secondary science methods courses in which the university practicum students were enrolled, observed some lessons and facilitated

reflective debriefing sessions with mentor-student teams. The teachers received 5 staff development unit (SDU) credits for their participation in this phase of the project.

The *Presentation* phase of the project will culminate in February, 1999 at the annual meeting of the Georgia Science Teachers Association (GSTA). At this meeting, teachers will present highlights of their project-related experiences. It is planned that the teachers will discuss their personal growth in mentoring and supervision, knowledge constructed about methods and strategies for working with science education students and early career science teachers, and relay issues and concerns unique to mentoring and supervision in science.

## Evaluation of Participants' Reactions to the Project

The participants' reaction to the $TS^3$ project (thus far) is revealed in analyses of three sources of data. First, the participants completed questionnaires prior to and following the summer $TS^3$ course. Secondly, the evaluator (Kemp) conducted semi-structured interviews with three of the participants during the fall semester as they were mentoring student or practicum teachers. All three teachers had had practicum students and student teachers prior to participating in the $TS^3$ project. And finally, the evaluator acted as a participant-observer by attending the summer course and fall sessions. He fully participated in the classes, including reading the assigned literature and talking informally with other participants during breaks. He also took notes about the activities and responses of participants during the meetings. The participants were informed about the evaluator's role during the first few minutes of the first meeting, and were reminded of his role several times during subsequent meetings. Even so, the participants seemed to fully embrace the evaluator as one of their own, or occasionally saw him as an intermediary between them and the course instructors.

The participants' overall response to the program has been very positive and highly favorable. When asked to rate their "overall satisfaction with the TS$^3$ summer course," all but one of the teachers rated the course a "6" or "7," on a seven point scale with "7" being strongly agree, giving an average of score of 6.56 (±1.01). Some of the teachers' comments about the course include:

- One of the BEST courses ever!
- I am very glad I took this course.
- I really thought it was very helpful.
- I know other teachers who thought their [regular] TSS training was a waste of time. I am very satisfied and feel positive about our training.

Thus, most of the participants enjoyed the course and felt they had improved their knowledge and skills related to preservice and first-year teacher supervision as a result of their participation.

In terms of specifics, the teachers felt that they had learned many valuable skills to help them supervise and mentor student teachers and first-year teachers of science. On the post-summer questionnaires, teachers indicated the summer course helped them improve their abilities related to helping student teachers improve their teaching, discussing issues with student teachers, evaluating student teacher effectiveness, working with college supervisors, and practicing classroom observation techniques. The post-summer questionnaire, or post-survey, had a seven-point scale, with "7" being "strongly agree." On one item the teachers (n=9) said they felt their ability to work with student teachers (6.56 ± 1.01) and first year teachers (6.33 ± 1.12) had improved as a result of their participation in the summer course. This perception of increased ability carried over into the fall semester. During an interview, one teacher remarked, "The TSSS training

has been an "eye-opening" experience. It helped me see how to analyze student teachers and focus on certain, important things." Another teacher said:

> Before I just thought, well, I've got to take this person from whatever stage they are in their teacher preparation, and move them down the line and just try to make them a better rounded teacher. It was just kind of slip-shod, flying by the seat of my pants. But now I'm much more aware of things that I can do to help the preparations, and work with the supervisor, also. I'm aware of roles that I can play. Whereas before it was, "Okay, let's just do the best we can here and see if we can get you ready for a teaching career." So I think the training this summer did help me a lot in being aware of sequencing, process, skill development, those sorts of things. What each person needs will vary with the student teacher, but my appreciation for the total picture and all the aspects of it are stronger now than they were before.

One of the aspects of the program that helped teachers be more systematic in their supervision was an "action plan" they developed during the summer. Most of them had never actually outlined what they wanted to help student teachers learn to do, even though most of them had supervised pre-service teachers before. As one participant said, "the action plan has got to be the key to how it works." Another remarked, "My action plan was very helpful. I think I accomplished 90% or more of it."

Teachers achieved a better understanding of the university's way of developing pre-service teachers as a result of the $TS^3$ program, and felt more confident about working with the university supervisors. One teacher said, "I now understand what goes on at the university better, although I am still somewhat nebulous. Carolyn especially provided us with a frame of reference." Another one remarked:

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> So, when I [got] a student teacher, I just thought they all came from the same bag up there. But they weren't! So, knowing how these people are being trained, and how these different programs relate to each other was ... helpful to me. ... I just had no concept of where these people came from. They were assigned to me, and I was going to make them welcome, and we were going to do the best we could, but I had no idea concept. So, that part of it's been helpful to me, too--understanding the system and how UGA does all that.

On the post-survey there was an average response of 6.11 (± 1.27) for the statement "As a result of my participation in this summer course, I feel that I have improved my knowledge and skills concerning ... what student teachers are currently being taught at the university." Teachers also rated their post-summer course ability to work with college supervisors very highly (6.67 ± 0.71).

One of the aspects that most participants enjoyed were the two scientists brought in as guest speakers during the summer course. However, even though they found the presentations interesting, a few of the participants did not feel the information would be useful to them in their teaching or mentoring. Their comments included:

- I thoroughly enjoyed Dr. ____ and his presentation--it was very informative and useful.
- Speaker handled presentation very well--without making me feel "stupid."
- Interesting info on a personal level--not beneficial to use w/ students (other than knowing about the Outreach Program)
- They were very interesting, but did not give me much to use in my class.
- I enjoyed the opportunity to stretch my own understanding of the topics without feeling intimidated by my ignorance!

Although the teachers enjoyed the presentations, they did not feel that they had improved their science content knowledge much during the summer. On a post-survey questionnaire, the teachers agreement averaged only 3.22 (± 2.33) for the statement "As a result of my participation in this summer course, I feel that I have improved ... my science content knowledge." In fact, the only questions on the post-survey which did not receive positive agreement (5 or better on a 7 point scale) were those that related to the amount of science content learned during the summer.

The participants not only learned how to supervise pre-service or first-year teachers, they also reported learning how to be a better teacher for their own students as a result of participating in the $TS^3$ course. On the post-survey, the teachers strongly agreed with the statement "As a result of my participation in this summer course, I feel that I have improved ... my ability to work with my own students" (average of 6.11 ± 1.17). They also responded with an average of 5.44 (± 1.81) to the statement regarding their improvement of knowledge and skills related to "modern science teaching methods." In the fall interviews, teachers made the following comments:

- The program helped me improve my own teaching methods.
- One thing the summer course did was help me understand how to formally evaluate a lesson.
- I am now more self-reflective. The training made me think about what I'm doing.

Other teachers also agreed they had learned about reflective teaching. On the post-survey questionnaire, there was an average response of 5.89 ± (1.69) for the statement "As a result of my participation in this summer course, I feel that I have improved my knowledge and skills concerning ... reflective teaching techniques."

Overall, only one of the teachers who completed the post-surveys responded neutrally (mostly giving 4's) instead of positively to the majority of questions. In his written

remarks, this teacher said "I didn't hear much that I already didn't know." The evaluator observed that the staff were only occasionally successful in fully engaging this particular person during presentations or activities. This person appears to have a learning style which differed from the other participants and the staff. This observation was supported during one of the summer activities in which the participants assessed their learning styles using the True Colors profile (published by TriPhoenix Publishing Company, Inc., 1990) . According to the person's own assessment, he or she probably learns best by doing and experiencing, and would prefer to be autonomous rather than directed by others. Therefore, this teacher may have benefited more from trying out on his/her own the information and skills presented during the summer course and fall seminars. However, this teacher has not been interviewed since the summer course, so no data are currently available to evaluate the long-term impressions of the $TS^3$ program on this individual.

Thus, all but one of the participants were enthusiastic about their newfound knowledge and abilities related to mentoring and supervision of pre-service teachers and first-year teachers of science. The participants felt they had learned how to be more systematic in helping novice teachers develop their skills. They felt more knowledgeable about the university's teacher education program, and how they fit into the "big" picture of science teacher development. And not least of all, the majority of the participants felt they had become better teachers as the direct result of participating in this science-specific Teacher Support Specialist program.

## Summary

The $TS^3$ project was funded by the Eisenhower, Title II program and prepared a cadre of 11 secondary science teachers capable of providing the subject specific instructional

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support and mentoring needed by science student teachers and early career science teachers. The project coupled the science specific needs of secondary teachers with the requirement of the Georgia TSS program in a 100-hour experience that included both summer workshop and sustained contact activities. University of Georgia scientists and science educators, secondary science teachers, and RESA personnel were involved in program planning and instruction. While still in its first year of implementation, the project has doubled the number of TSS certified secondary science teachers in the 13 school systems served by Northeast Georgia RESA and has provided opportunities for area secondary science teachers and university science educators to discuss important issues of science teacher education. The discussions are contributing ideas for ongoing efforts to reform science education field experiences at the University of Georgia.